

Closeout Report

of the

Director's Review

of

MINOS/CDMS

Soudan Mine Operations

May 14-15, 2003

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Soudan Underground Laboratory Operations Director's Review

Executive Summary

A Fermilab Director's Review was held of the present and proposed Soudan Underground Laboratory (SUL) Operations for the MINOS (Main Injector Neutrino Oscillation Search) and CDMS (Cold Dark Matter Search) experiments on May 14 and 15, 2003.

Initial estimates for FY04 operations of MINOS and CDMS at SUL were presented. These budgets were based on an Operations Model which was presented by MINOS, CDMS and SUL personnel. The assumed Operations plans are consistent with the Fermilab Physics Advisory Committee approved program for MINOS operations prior to NuMI providing a neutrino beam and with the approved CDMS experimental plan.

The cost estimate for these operations is based on several years of experimental operations at SUL and are judged to be reasonable. The present funding guidance does not meet the estimated requirements. It is therefore recommended that MINOS/CDMS/SUL re-examine the operating plans and estimates for possible cost reductions that are programmatically acceptable and negotiate a mutually agreeable funding level with Fermilab.

The overall management arrangements for these Fermilab programs being executed at SUL in partnership with the University of Minnesota (UM) seem to be working well. As CDMS and MINOS become operational, specific arrangements for management control of the operations at SUL need to be agreed on by UM and Fermilab principals. This committee recommends a rigorous and rather detailed utilization of MOU (Memorandum of Understanding), SOW (Statement of Work), PO (Purchase Order), invoicing, management reserve, and change control mechanisms be applied to achieve an adequate level of management control to deliver the operations within agreed upon budgets.

A presentation was given on possible expanded programs that would benefit from a continuing Fermilab / UM Partnership in scientific research. The presentation addressed the possibility of an Off-Axis Neutrino Experiment and a proposal for a National Underground Science and Engineering Laboratory (NUSEL) at Soudan. These possibilities plus the potential for other experiment initiatives at the existing Soudan facilities point to the need for Fermilab and UM to agree on some mechanism or procedure to, where appropriate, jointly review and approve program expansion.

1.1 Status and Operating Plans

Findings

- The Soudan Underground Laboratory contains two major experiments, MINOS and CDMS. Both are moving from a construction phase into an operating mode. As this transition is made there will be a substantial reduction in the number of technical staff employed and in the number of on-site physicists.
- MINOS is expecting to complete construction within a few weeks. It will be run to fully commission the detector and take cosmic ray data until 2005 when the FNAL neutrino beam is available. It is expected that the running with beam will last for at least 3 years. It is technically possible to monitor and operate the detector over the internet and stations are planned for the underground location, a surface location close to the mine, FNAL and possibly RAL. Improvements to the network are highly desirable but not essential for operation from a distance. A major limitation is that the fiber network does not yet extend to Tower and there are some minor concerns with network reliability between FNAL and Soudan – downtime is currently estimated at about one hour per month. The fiber running down the shaft to the experimental areas has only broken once in 15 years of Soudan operation and can be quickly repaired if damaged. The MINOS collaboration does not believe there are any safety implications to running the detector remotely.
- In the period leading up to beam data taking, it is desirable but not essential to have full time access to the detector. However, once beam related data taking begins it is expected that a live time of > 95% will be maintained. A number of maintenance issues have been identified. Some failure modes such as DAQ crashes cause the data taking to stop. Other faults would not require immediate access to recover. There have been a number of high voltage trips. These can be reset remotely. There are about 2 PMT base failures per week (out of a total of 1600 tubes). These need an underground presence to replace. However, the detector performance is not greatly degraded by the loss of one or two tubes and it is possible to remove HV on individual tubes.
- It is planned to provide a crew underground only on week days and only on the day shift. Any other underground coverage would be on a call out basis. This may not be necessary during cosmic ray data taking but is important during beam data taking. It is expected that a permanent staff of 6 people are required in addition to the physicists to maintain this operation.
- CDMS has two towers of detectors installed and cold at Soudan. Data taking will commence shortly. Installation of towers 3,4 and 5 is planned for next year. Maintenance of the cryogenic systems is a critical part of operating the detector. One technician is assigned to this task. The transportation of

cryogenic liquids is a significant part of the materials handling at the lab. It is essential to maintain access to the equipment because a fault in the cryogenic equipment could lead to long (month to year) down time for the project. This requires having technical staff and cage staff on-call at all times.

- Activities at CDMS will peak at times when new towers are installed (planned for summer of 2004). The effort for this will come from the university groups. There may be a need for some travel support for FNAL staff to assist with this operation but there will not be any additional technical effort hired for these periods.

Comments

- The level of on-site physicists appears light given the need to maintain a high live time for the MINOS Detector.
- It is essential that there be good communications between the MINOS Detector control and the accelerator control facilities. Beamline monitoring capabilities are essential at any detector control areas.

Recommendations

- None

1.2 Management of Soudan Underground Laboratory

SUL Management – DNR

Finding

- FNAL is the sole source of funds to support SUL operations. FNAL does not deal with DNR, yet pays for leases and other items.

Comments

- There exist some discrepancies in understanding of Fermilab's specific responsibilities, which need to be discussed and resolved. One such item for discussion is the location of fiscal responsibility for disassembly of the SOUDAN 2 experiment.
- FNAL should concur in the planned DNR costs, as they are a large fraction of the operations costs. At present this 3-body problem is factored into SUL-FNAL and SUL-DNR.

Recommendation

- A mutually agreed upon mechanism should be found with all parties signing or concurring on a SOW for annual ops costs. Roles and responsibilities of all 3 parties should be agreed upon.

Tracking and Reporting

Finding

- There is no coherent WBS which is agreed between SUL management and the MINOS Project Manager. There are no apparent “thresholds” put in place for PM signoff prior to incurring payments.

Comment

- A SOW should be written with a threshold that requires the PM to agree to predicted (e.g. estimated costs from receipt of bids) cost overruns before they occur. An annual SOW covering ~ 1 M\$ in costs should have sufficient granularity (~ 100 WBS items) so that tracking at the 10 k\$ level is possible. A rolled up report/invoice loses too much detail to be useful. One can overspend hugely on several items and not see an overrun on the total MPO.

Recommendation

- Rewrite the WBS in an agreed upon fashion for MINOS before operations are (formally) begun. Include all resources needed to operate CDMS and MINOS even if they appear at no cost. University of Minnesota should report/invoice costs at the lowest level of the operations WBS.

Operations Change Controls

Finding

- Change Orders can be made in the field without PM prior approval. There is no formal mechanism for change control.

Comment

- Were a SOW in place, the agreed upon estimated costs of each ~ 10 k\$ item would be known to all parties. Costs found to be in excess - prior to payment - could then be approved automatically if below a threshold, approved by the PM if below a second threshold, and approved by the Directorate of FNAL if above that second threshold.

Recommendation

- Set up a series of thresholds which are agreed to by all parties. Initiate Change Control on that basis and explicitly get agreement in the SOWs on those thresholds.

Completeness

Findings

- SOWs are not in place for all parties engaged in SUL operations. Therefore, it is impossible to assess the level of support which will be provided by MINOS and CDMS collaborating institutions.

Comments

- The SOW should have as signatories each group, Fermilab, the relevant Spokesperson and the SUL management

- The present operations plan is not reviewable because it is incomplete. There is risk of “default” by collaborating institutions.

Recommendation

- Draft a complete set of SOWs with all collaborating institutions using the SUL facilities. Assess the proposed budget in the light of the totality of the contributions of all the collaborating groups. Put all the SOW in place prior to FY04.

Operations Budget

Finding

- The operations costs of MINOS are ~ 0.7 M\$ in FY02, ~ 0.75 (+0.4 M\$) M\$ in FY03 and 1.2 M\$ in FY04. In addition, the CDMS costs appear to be ~ 0.35 M\$. There are also costs in the CD and costs in PPD for MINOS operations at FNAL which are not now estimated. There is no identified reserve, which could be used to fix problems which are bound to arise. In addition, there are hints that the estimate is “light” - e.g. J. Meier has 3 full time jobs. The NUMI costs are not easily extrapolated from the stated SOUDAN2 ops costs.

Comment

- FNAL appears to have given preliminary guidance of 1.0 M\$ for SUL operations in FY04. There is a clear contradiction which will have to be resolved before launching formal operations.

Recommendation

- “Scrub” the estimated costs to come within the (possibly revised) guidance given by FNAL, including all costs not yet estimated and a plausible level of management reserve. Iterate the process with Fermilab.

Running Budget

Finding

- Planning for data taking operations at Fermilab is not yet defined. Issues include CD costs, space for VCR, PAC , costs of permanent medium, etc.

Comment

- Ramping up for full beam on data taking should be explicitly planned for. Operations at SUL are likely only slightly increased in cost. However, as FNAL is the analysis nexus, a major change might be expected in the resources deployed at FNAL for MINOS analysis. Guidance from Fermilab as to available resources would be a help in the planning exercise.

Recommendation

- Begin planning within the collaboration for data taking and analysis. Work with FNAL to set the scope of that operation.

1.3 Cost Estimate and Planned Funding

The committee charge included a request to evaluate the Soudan Underground Laboratory's (SUL) operating expenses, both manpower and materials and services, in light of present budget allocations and potential budget reductions. Assessing the operations budget in detail was made difficult by a lack of underlying information, including signed MOUs, SOWs, and operational requirements. Securing this information will provide for the preparation of a more complete and accurate operating budget and will afford a more accurate assessment of potential Fermilab financial liability, in terms of cash and in-kind funding. The following findings and recommendations address these issues in detail.

University of Minnesota and Fermilab MOU

Finding

- The MOU between the University of Minnesota (UM) and Fermilab for the operation of the Soudan Underground Laboratory is in draft form.

Comment

- The MOU between University of Minnesota and Fermilab for the operations of the Soudan Underground Laboratory should be finalized to define critical interfaces, operational requirements and performance expectations

Recommendation

- In finalizing the MOU for Soudan Underground Lab operations, the committee recommends that the MOU be augmented to address the following issues:
 - Responsibilities with respect to the future possibility for Soudan II operations
 - De-commissioning responsibilities for the CDMS, MINOS, Soudan II experiments
 - Process for reviewing and approving the proposed use of Soudan Underground Lab space by non-Fermilab projects.
 - Plans and requirements for disposing of Soudan Underground Lab infrastructure paid for with DOE funds, at the termination of Fermilab operations at Soudan.

Operational Requirements

Finding

- Operational requirements for each experiment at the Soudan Underground Lab are not formally defined. Without formal requirements, it is difficult to

determine whether all minimal needs are being accounted for and where costs can be reduced by eliminating unnecessary items.

Recommendation

- Formalize in writing the operational requirements for the CDMS and MINOS experiments, including a timeline that allows for proper operations planning and budgeting.

SOWs and MOUs

Finding

- Statements of Work and MOU's exist for construction activities, but have not yet been developed for the operations phase of each Fermilab experiment.

Comment

- SOW's and MOU's for the operations phase of CDMS and MINOS need to be defined and formalized before an accurate operations budget can be prepared and approved.

Recommendation

- Finalize the operations SOW's and MOU's for each experiment (CDMS and MINOS) and each participating institution (Texas, RAL, etc). Include specifics for FY04 and the intent through the end of the currently funded project lifetime.

FY04 Operations Budget

Finding

- The FY04 SUL operations budget needs to be scrubbed before being approved.

Comments

- Cost estimates on various slides are slightly different and some operations costs appear in different budgets (e.g., the \$300K budget for CDMS-specific costs for cryogenics, technician, travel, and supplies that did not appear in the SUL operations budget). The total operations budget needs to be scrubbed jointly by the SUL managers and the CDMS and MINOS project managers.

- While the committee acknowledges that preparing the budget based on past operating costs is appropriate, the extrapolation of Soudan II operating costs to those of the MINOS and CDMS experiments should be carefully reviewed.
- There is a general concern that the SUL operations staffing estimate is light (e.g. network support is likely to require more than a fraction of one person)
- Quality of life issues should not be taken lightly in the spirit of reducing costs. The committee acknowledges that working in a remote area under somewhat extreme conditions can be wearing on individuals.
- Management reserve should be included in operations budget (5-10%)

Recommendation

- The Soudan Operations Manager should refine the operations budget in consultation with SUL and CDMS managers.

Finding

- The SUL operations budget, as currently prepared, reflects only a portion of the total cost of operating the MINOS and CDMS experiments at Soudan. Additional operating funds will be allocated to CDMS and MINOS budgets through the Fermilab Particle Physics Division (PPD). In addition, a number of in-kind services are expected from the Fermilab Computing Division (CD), including data processing, tape media, off-site network support, etc.

Comment

- The full forecasted cost of operating the two experiments at SUL in FY04 should be understood by Fermilab management before the SUL operations budget is approved. This will also help ensure that operating costs are not double-counted or inadvertently left out.

Recommendation

- The Soudan Operations Manager should prepare an operating budget for FY04 that includes all anticipated cash-funded and in-kind costs associated with Fermilab operations at SUL. This includes SUL operations, CDMS, MINOS, PPD and CD in-kind services, etc.

Long-Term Operations Budget

Finding

- A long-term budget showing the cost forecast for completing the MINOS and CDMS experiments at Soudan does not exist.

Recommendation

- A complete bottoms-up operations budget should be prepared that forecasts the total cost of operating the two approved experiments through 2011. This would allow Fermilab and the UM to understand the total estimated cost of operations.
 - The budget must map to operational requirements (allows potential de-scoping based on funding constraints)
 - The budget should address commissioning, ramp-up, and decommissioning for each project. Cost savings may realized by decommissioning and removing projects from Soudan at their completion. For example, if CDMS terminates in 2005, removing the experiment from the facility may result in reduced lease and laboratory operating expenses.
 - The operations budget should include management reserve at a level commensurate with cost forecast uncertainty. The level of management reserve should be negotiated between Fermilab and SUL management. An initial management reserve of 5-10% would seem reasonable.
 - The operations budget should include a reference to future capital improvements (e.g., increased network connections, improved office work space).
 - The impact of Soudan II must be factored into operating budget (i.e., future operating and decommissioning plans)
 - DNR leases should be negotiated through project end wherever possible to fix future costs.

Operations Budgeting Process

Recommendation

- In addition to the aforementioned recommendations, the committee recommends that a process be implemented for evaluating the long-term Soudan Underground Lab experimental program cost-to-complete operating budget and for approving annual Soudan Underground Lab operating budgets. Such a process might include the following elements:
 1. On an annual basis, the Soudan Operations Manager prepares a bottoms-up operations budget (cash and in-kind) based on approved experiment requirements and Fermilab funding guidance.
 2. Fermilab management convenes a review panel to review the budget in light of SOWs, operating requirements, funding constraints, etc., and make recommendations on the budget to Fermilab management. Budget review and revision is an iterative process until the budget is approved.

3. Budgets for each fiscal year are approved on an annual basis by Fermilab. At the same-time, revised long-term operating cost-to-complete forecasts are reviewed

1.4 Possible Impact of Potential Laboratory Program Expansion

Findings

- Some high quality underground experimental space is available or soon to be available. This includes
 1. MINOS staging area/3rd supermodule space
 2. Behind MINOS
 3. Soudan II area
- There is a small experiment (Majorana) that has recently appeared in this space.
- There will be a neutrino beam.
- Current activities for CDMS are assumed to end in 2005 and for MINOS in 2010.
- CDMS in particular is sensitive to dust, vibration, and power disturbances. MINOS is also sensitive to the last two, but less so. There could be interference to either of these experiments from either major or minor construction in the immediate vicinity. Limitation on access due to other activities can be a major interference for both experiments.
- A potential off-axis detector would be tens of km away and construction on any major laboratory upgrade would be unlikely to start before 2006, so significant interference from the Off-axis detector or NUSEL proposals seems unlikely.

Comments

- Developed underground laboratory space is a unique and valuable resource for science. The potential of the space at Soudan is enhanced by the presence of a neutrino beam. A small experiment has already been installed. It is not causing any problems, but the installation was done without consultation with Fermilab. It seems probable that other potential users will appear, and they could easily be on larger size scales, and could all potentially interfere with the ongoing experiments. They will also have an impact on the operations costs.
- FNAL and UMN both have a vested interest in the efficient utilization of the Soudan Laboratory space, and FNAL of course must be concerned about potential interference to the MINOS and CDMS experiments and impact on their costs. A mechanism is needed to encourage and ensure the best

scientific use of this resource with minimal impact on the ongoing experiments. A partnership between FNAL and UMN seems desirable to allocate space in collaboration with the relevant funding agencies. It seems reasonable that at least the marginal costs of new activities be borne by the new experiments themselves, and major new initiatives should probably further share the amortized infrastructure costs.

- We believe that it would be prudent to have a mechanism in place to make these prioritizations and evaluate potential interferences before the necessity arises. This will avoid misunderstandings and the possibility that actions are taken before these decisions are made.

Recommendation

- FNAL and UMN should meet to work out a formal long-term agreement on the management of scientific activity at the Soudan underground laboratory. This should be done in consultation with the relevant funding agencies. The agreement should include mechanisms for prioritizing competing experiments, for evaluating potential interference with ongoing experiments, and for appropriate cost sharing.

Action Item

- MINOS/CDMS/SUL examine operating estimates for reductions that are programmatically acceptable and present an updated plan to Fermilab management in August, 2003. Fermilab management will decide whether an additional review is appropriate.

Appendix A

**Director's Review of MINOS/CDMS - Soudan Laboratory Operations
May 14-15, 2003**

Charge to the Review Committee

The primary purpose of this review is to assess management and budget matters regarding the operation of Fermilab experiments at the Soudan Underground Laboratory. (Note this is not to be a technical review of the experiments, though technical issues may need to be addressed in order to understand operations.)

The Committee should review the status of the on-going Fermilab Experiments at the Soudan Underground Laboratory, in particular the way they will operate at the Laboratory. The overall management of the Laboratory should be assessed, with particular attention being paid to the role played by Fermilab. The Laboratory's operating expenses, both manpower and materials and services, should be evaluated in light of present budget allocations and potential budget reductions.

We would like the Committee to comment on the relationships among the interested parties, namely Fermilab, the University of Minnesota and the Minnesota Department of Natural Resources.

We would like the Committee to comment on the possible impact of the proposed potential expansion of the Laboratory program on the current program activities.

The Committee should review and comment on current and planned MOU/SOW/PO (MOU – Memorandum of Understanding, SOW – Statement of Work, PO – Purchase Order) procedures and the effectiveness of using these processes to highly specify the scope of operations. Cost estimates including labor should be addressed answering the questions

- What's involved??
- What's in??
- What's not??

The Committee should examine management structure and instruments used for management agreements, specifying budget, facility components, and identifying any University of Minnesota and Minnesota Department of Natural Resources contributions.

Appendix B

**Director's Review of MINOS/CDMS - Soudan Laboratory Operations
May 14-15, 2003**

Review Committee

Bill Boroski, FNAL
Steve Brice, FNAL
Peter Garbincius, FNAL
Dan Green, FNAL
Dean Hoffer, FNAL
Dan McCammon, University of Wisconsin
Wyatt Merritt, FNAL
Dave Sinclair, Carlton University
Jim Stone, Boston University
Ed Temple, FNAL

Director's Review of MINOS/CDMS - Soudan Laboratory Operations
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Agenda

Wednesday, May 14, 2003 – Comitium

8:30	Executive Session	Review Committee
9:00	Welcome	E. Temple
9:10	Introduction and Overview of Talks	R. Rameika
9:20	Lab Management and Organization (I)	E. Peterson
10:00	Status of CDMS	B. Cabrera
10:30	Break	
10:45	Status of MINOS	S. Wojcicki
11:15	MINOS Installation Closeout & Operations	Jeff Nelson
11:45	CDMS Operations Model	Dan Bauer
12:15	Networking and Computer Support at SUL	Liz Buckley-Geer
12:30	Lunch	
1:30	Safety and Outreach Programs at SUL	B. Miller
1:45	Laboratory Operating Budget Analysis	Gina Rameika
2:30	Laboratory Management and Organization (II)	Earl Peterson
3:15	Break	
3:30	Breakout Sessions	
4:45	Closed Session	review committee & invitees
5:30	Executive Session	review committee
6:30	Dinner	

Thursday, May 15, 2003 – Comitium

8:30	Laboratory Operating Model	J. Nelson
9:15	MINOS Control Room at FNAL	C. James
9:30	Planning for Future Initiatives	M. Marshak
10:00	Break	
10:15	Resume Breakouts/Begin Report Writing	
12:00	Lunch	
1:00	Finalize Report	
2:00	Closeout Dry Run	
3:00	Close with Management	

Recommendations from the Director's Review MINOS/CDMS – Soudan Mine Operations
May 14-15, 2003

No	Responsible	Recommendations	Status	Date
		<i>1.1 – Status and Operating Plans</i>		
1.1.1		None		
No	Responsible	Recommendations	Status	Date
		<i>1.2 – Management of Soudan Underground Laboratory</i>		
		SUL Management - DNR		
1.2.1		A mutually agreed upon mechanism should be found with all parties signing or concurring on a SOW for annual ops costs. Roles and responsibilities of all 3 parties should be agreed upon.		
		Tracking and Reporting		
1.2.2		Rewrite the WBS in an agreed upon fashion for MINOS before operations are (formally) begun. Include all resources needed to operate CDMS and MINOS even if they appear at no cost. University of Minnesota should report/invoice costs at the lowest level of the operations WBS.		
		Operations Change Controls		
1.2.3		Set up a series of thresholds which are agreed to by all parties. Initiate Change Control on that basis and explicitly get agreement in the SOWs on those thresholds.		
		Completeness		
1.2.4		Draft a complete set of SOWs with all collaborating institutions using the SUL facilities. Assess the proposed budget in the light of the totality of the contributions of all the collaborating groups. Put all the SOW in place prior to FY04.		
		Operations Budget		
1.2.5		“Scrub” the estimated costs to come within the (possibly revised) guidance given by FNAL, including all costs not yet estimated and a plausible level of management reserve. Iterate the process with Fermilab.		

Recommendations from the Director's Review MINOS/CDMS – Soudan Mine Operations
May 14-15, 2003

No	Responsible	Recommendations	Status	Date
		Running Budget		
1.2.6		Begin planning within the collaboration for data taking and analysis. Work with FNAL to set the scope of that operation.		
		Section 1.3 – Cost Estimate and Planned Funding		
		University of Minnesota and Fermilab MOU		
1.3.1		<p>In finalizing the MOU for Soudan Underground Lab operations, the committee recommends that the MOU be augmented to address the following issues:</p> <ul style="list-style-type: none"> - Responsibilities with respect to the future possibility for Soudan II operations - De-commissioning responsibilities for the CDMS, MINOS, Soudan II experiments - Process for reviewing and approving the proposed use of Soudan Underground Lab space by non-Fermilab projects. <p>Plans and requirements for disposing of Soudan Underground Lab infrastructure paid for with DOE funds, at the termination of Fermilab operations at Soudan.</p>		
		Operational Requirements		
1.3.2		Formalize in writing the operational requirements for the CDMS and MINOS experiments, including a timeline that allows for proper operations planning and budgeting.		
		SOWs and MOUs		
1.3.3		Finalize the operations SOW's and MOU's for each experiment (CDMS and MINOS) and each participating institution (Texas, RAL, etc). Include specifics for FY04 and the intent through the end of the currently funded project lifetime.		

Recommendations from the Director's Review MINOS/CDMS – Soudan Mine Operations
May 14-15, 2003

No	Responsible	Recommendations	Status	Date
		FY04 Operations Budget		
1.3.4		The Soudan Operations Manager should refine the operations budget in consultation with SUL and CDMS managers.		
1.3.5		The Soudan Operations Manager should prepare an operating budget for FY04 that includes all anticipated cash-funded and in-kind costs associated with Fermilab operations at SUL. This includes SUL operations, CDMS, MINOS, PPD and CD in-kind services, etc.		
		Long-Term Operations Budget		
1.3.6		<p>A complete bottoms-up operations budget should be prepared that forecasts the total cost of operating the two approved experiments through 2011. This would allow Fermilab and the UM to understand the total estimated cost of operations.</p> <ul style="list-style-type: none"> - The budget must map to operational requirements (allows potential de-scoping based on funding constraints) - The budget should address commissioning, ramp-up, and de-commissioning for each project. Cost savings may be realized by decommissioning and removing projects from Soudan at their completion. For example, if CDMS terminates in 2005, removing the experiment from the facility may result in reduced lease and laboratory operating expenses. - The operations budget should include management reserve at a level commensurate with cost forecast uncertainty. The level of management reserve should be negotiated between Fermilab and SUL management. An initial management reserve of 5-10% would seem reasonable. - The operations budget should include a reference to future capital improvements (e.g., increased network 		

Recommendations from the Director's Review MINOS/CDMS – Soudan Mine Operations
May 14-15, 2003

		connections, improved office work space). - The impact of Soudan II must be factored into operating budget (i.e., future operating and decommissioning plans) DNR leases should be negotiated through project end wherever possible to fix future costs.		
		Operations Budgeting Process		
1.3.7		<p>In addition to the aforementioned recommendations, the committee recommends that a process be implemented for evaluating the long-term Soudan Underground Lab experimental program cost-to-complete operating budget and for approving annual Soudan Underground Lab operating budgets. Such a process might include the following elements:</p> <ol style="list-style-type: none"> 1. On an annual basis, the Soudan Operations Manager prepares a bottoms-up operations budget (cash and in-kind) based on approved experiment requirements and Fermilab funding guidance. 2. Fermilab management convenes a review panel to review the budget in light of SOWs, operating requirements, funding constraints, etc., and make recommendations on the budget to Fermilab management. Budget review and revision is an iterative process until the budget is approved. 3. Budgets for each fiscal year are approved on an annual basis by Fermilab. At the same-time, revised long-term operating cost-to-complete forecasts are reviewed. 		

Recommendations from the Director's Review MINOS/CDMS – Soudan Mine Operations
May 14-15, 2003

No	Responsible	Recommendations	Status	Date
		<i>Section 1.4 – Possible Impact of Potential Laboratory Program Expansion</i>		
1.4.1		FNAL and UMN should meet to work out a formal long-term agreement on the management of scientific activity at the SOUDAN underground laboratory. This should be done in consultation with the relevant funding agencies. The agreement should include mechanisms for prioritizing competing experiments, for evaluating potential interference with ongoing experiments, and for appropriate cost sharing.		